

Failure Modes and Effects Analysis/Critical Items List

Document Number: JSC-38378 Document Rev. No.: C Document Date: 8/26/97
 Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: Mode Select Switch Qty: 1 FMEA Number: US-SFR-400
 Item Part Number: 232AT203 ORU Name: SAFER
 Subsystem Name: HCM ORU Part Number: SED33105900-311
 Function: Directs hand controller commands for either rotation or translation control modes.

Item Type Designator: C PG/IP Identifier: N/A
 Reference Designator/Find No.: N/A Drawing Number: SED33106100
 Logistics Control Number: N/A

End Item Name: SAFER
 End Item Capability: Six degrees of freedom through 24 thrusters, each rated at 0.8 ± 0.08 lbs. force in vacuum.
 End Item Function: Provides emergency EVA self-rescue for separated crewmember.
 ISS Zone: EVA Shuttle Zone: EVA

Criticality

Critical Item: Yes: _____ No: X Criticality Category: ISS: 1R Shuttle: 1R/3
 Success Paths: Success Paths Remaining:

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: Mode Select Switch fails to switch from translate to rotate mode.
 Failure Mode Code:
 Failure Cause: Switch Failure, EEE part failure, short/open circuit, contamination, software error, radiation event, EMI.
 Failure Detection:
 Flight: IVA – IVA checkout
 EVA – Loss of full six degrees of freedom.
 Ground: Functional Test.
 Time To Detect Quantity: 10 Time To Detect Units: Seconds
 Correcting Action: If a failure is detected during IVA checkout, the back-up SAFER (if available) will be used.
 Remarks: With the mode select switch failed in one position, SAFER has four degrees of freedom capability. Self-rescue with degraded control may still be accomplished.
 Failure Effect Phase: EVA Operations Affected Stage(S): EVA Operations

Failure Effect

On ORU/Assembly:
 First/Second Failure: Inadvertent EVA crewmember separation.
 Third (this) Failure: Loss of full six degree-of-freedom capability.
 On Subsystem/Next Assembly: None
 On End Item/Segment: Unable to translate back to structure or arrest previous motion.
 On Crew/ISS: Possible loss of crewmember. Possible damage to EMU/Orbiter/ISS.
 Time To Effect Quantity: 1 Time To Effect Units: Minutes

Redundancy Screen

ISS (Shuttle)
 Checkout Pre-Launch (A): Pass
 Checkout On-Orbit (B): N/A
 Detection Flight Crew: Pass Or Detection Ground Crew: Fail
 Loss Of Redundancy
 From A Single Cause (C): Pass